Attorney Docket No.: 09250.0001-00000

<u>Claims</u>

- 1. An apparatus comprising:
- a power source providing current pulses with high frequency harmonics to a heater coil, the coil generating a magnetic flux for inductive heating of an article.
- An apparatus according to claim 1,
 wherein the high frequency harmonics enhance a relative proportion of inductive heating compared to resistive heating of the heater coil.
- 3. An apparatus according to claim 1,
 wherein the current pulses produce an increased amount of inductive heating compared to a resonance sinusoidal signal.
- 4. An apparatus according to claim 1, wherein the current pulses produce an increased amount of inductive heating compared to a sinusoidal current of a same magnitude and same fundamental frequency.
- 5. An apparatus according to claim 1, wherein the current pulses have an associated energy component above a border frequency of the heater coil.
- An apparatus according to claim 1,
 wherein the current pulses increase an inductive portion of heating in
 the article without increasing the Root Mean Square (RMS) current in the heater coil.

- An apparatus according to claim 1,
 wherein the power source includes a low or line frequency current source.
- 8. An apparatus according to claim 1,
 wherein the heater coil includes a resistive conductor for generating
 resistive heat.
- An apparatus according to claim 8,
 wherein the resistive conductor is in thermal communication with the article.
- 10. An apparatus according to claim 1, wherein the heater coil is inductively coupled to a load which includes the article.
 - An apparatus according to claim 10,
 wherein the magnetic flux induces eddy currents in the load.
 - 12. An apparatus according to claim 10,wherein the load includes a closed loop for the magnetic flux.
- 13. An apparatus according to claim 12,

 wherein the load includes a ferromagnetic core and ferromagnetic yoke which form the closed loop.
- 14. An apparatus according to claim 10, wherein the load includes a core and the heater coil is at least partially embedded in the core.

- 15. An apparatus according to claim 10, wherein the load includes a core and a yoke and the heater coil is disposed between or embedded within at least one of the core and yoke.
 - 16. An apparatus according to claim 15,wherein the core and yoke form a closed loop for the magnetic flux.
 - An apparatus according to claim 15,
 wherein the core and yoke are ferromagnetic.
- 18. An apparatus according to claim 10, wherein the load includes a core having a passageway for a flowable material.
 - 19. An apparatus according to claim 18,wherein the core heats the flowable material.

An apparatus according to claim 1,

- 20. An apparatus according to claim 1, wherein the heater coil is positioned in the core so that heating is concentrated in the passageway.
- wherein the article forms at least part of a closed loop for the magnetic flux, the article having a first portion in which inductive heating is more concentrated compared to a second portion of the article.
- 22. An apparatus according to claim 21, wherein the second portion creates discontinuities or restrictions to the flow of eddy currents.
 - 23. An apparatus according to claim 22,

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wherein the second portion has slots creating the discontinuities or restrictions.

24. An apparatus comprising:

a variable power source for providing current pulses with an adjustable energy content to a heater coil so as to adjust a ratio between inductive and resistive heating produced by the coil.

25. An apparatus comprising:

a heater coil inductively coupled to an article;

the article having a passageway for a flowable material to be heated;

the coil being positioned in the article to deliver heat generated

inductively in the article to the flowable material in the passageway; and

a source of adjustable nonsinusoidal current pulses coupled to the heater coil for adjusting the delivery of inductive heating to the flowable material in the passageway.

26. A method comprising:

providing a heater coil in thermal communication with and inductively coupled to an article; and

providing an adjustable nonsinusoidal current pulse signal to the heater coil for adjusting the ratio between inductive and resistive heating of the article.

27. A method comprising:

providing a heater coil inductively coupled to an article; and

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providing a nonsinusoidal current pulse signal to the heater coil with the pulse having a rate of change which produces high frequency harmonics.

28. An apparatus comprising:

an article to be inductively heated;

a heater coil generating a magnetic flux and inductively coupled to the

article;

the article forming at least a portion of a closed loop for the magnetic

flux;

heater coil.

the heater coil being at least partially embedded in the article; and a current pulse signal with high frequency harmonics supplied to the